

All Contractor designed temporary works, work methods and operations shall conform to the Contract and the following standards: the American Association of State Highway and Transportation Officials, the Occupational Safety and Health Administration (OSHA).

~~8-202~~ MATERIALS

The following is added at the end of this section:

Materials for duct banks shall meet the requirements of the following sections:

Utilities on Bridge	6-01.10(A)
Concrete Structures	6-02
Gravel Backfill	9-03.12
Illumination, Signal, Electrical	9-29

~~8-203~~ CONSTRUCTION REQUIREMENTS

~~8-203(1)~~ GENERAL

The following is added at the end of this section:

Prior to performing any work related to the temporary traffic signal revisions at South Cloverdale Street and 14th Avenue South, the Contractor shall coordinate through the Engineer with the City of Seattle Traffic Signal Maintenance and Operations for implementation of signal timing revisions. The signal and timing for the final stage shall be restored to the same condition as at the beginning of the project unless otherwise allowed by the Project Engineer.

~~8-203(5)~~ CONDUIT

This section is deleted in its entirety and replaced with the following:

Installation of conduit shall conform to appropriate articles of the Code and these Specifications.

The size of conduit used shall be as shown in the Plans. Conduits smaller than 1-inch electrical trade size shall not be used unless otherwise specified, except that grounding conductors at service points may be enclosed in 1/2 -inch diameter conduit.

It shall be the option of the Contractor, at no expense to the Contracting Agency, to use larger size conduit if desired, and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. Reducing couplings will not be permitted.

The ends of all conduits shall be well reamed to remove burrs and rough edges. Field cuts shall be made square and true. Slip joints or running threads will not be permitted for coupling metallic conduit. When a standard coupling cannot be used, an approved threaded union coupling shall be used. The threads on all metallic conduits shall be rust-free, clean and well painted with a good quality colloidal copper suspended in a petroleum vehicle before couplings are made up. All couplings shall be tightened so that a good electrical connection will be made throughout the entire length of the conduit run. If the conduit has been moved after assembly, it shall be given a final tightening from the ends prior to backfilling. Non-metallic conduit shall be

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1 assembled using the solvent cement specified in Section 9-29.1. Where coating on galvanized
2 conduit has been injured in handling or installing, such injured places shall be thoroughly painted
3 with galvanizing repair paint, Formula A-9-73.

4 Conduit ends shall be capped (do not glue non-metallic caps). Metallic conduit ends shall be
5 threaded and capped with standard threaded conduit caps until wiring is started. When conduit
6 caps are removed, the threaded ends shall be provided with approved conduit bushings or end
7 bells (do not glue in place) for nonmetallic conduit.

8 Conduit stubs from controller cabinet foundations shall extend to the nearest junction box in that
9 system.

10 Metallic conduit stubs, caps, and exposed threads shall be painted with galvanizing repair paint
11 Formula A-9-73.

12 Metallic conduit bends, shall have a radius consistent with the requirements of Article 344.24
13 and other articles of the Code. Where factory bends are not used, conduit shall be bent, using an
14 approved conduit bending tool employing correctly sized dies, without crimping or flattening,
15 using the longest radius practicable.

16 Nonmetallic conduit bends, where allowed, shall conform to Article 352.24 of the Code.

17 Conduit shall be laid so that the top of the conduit is a minimum depth of:

- 18 1. 24 inches below the subgrade including asphalt or concrete shoulder areas and
19 asphalt or concrete sidewalk areas.
- 20 2. 48 inches below the bottom of ties under railroad tracks unless otherwise
21 specified by the Rail Road Company.
- 22 3. 18 inches below the finish grade in all other areas.

23 Galvanized steel conduit shall be installed at the following locations:

- 24 1. All railroad crossings.
- 25 2. All pole risers, except as otherwise required by owning utilities.
- 26 3. All bends with radius less than 3 feet on runs over 180 feet in length. Runs
27 embedded within reinforced concrete structures are exempted.
- 28 4. All other locations noted in the Contract.
- 29 5. All runs externally attached to structures.
- 30 6. All runs installed in barrier that is constructed by slip forming

31 Galvanized steel conduit or Schedule 80 polyvinyl chloride (PVC) conduit shall be installed at
32 the following locations:

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1. All roadbed crossings.
2. All conduit entering foundations.
3. All other locations noted in the Contract.

Schedule 40 or Schedule 80 PVC conduit shall be installed at the following locations:

1. All runs installed at traffic signal installations, except road crossings or where externally attached.
2. All other locations noted in the Contract.

Non-metallic conduit may be employed as an alternate to metallic conduit at other locations unless specified otherwise in the Contract. Nonmetallic conduit installation shall include equipment grounding conductor and shall conform to requirements noted in the WSDOT Standard Plans.

Liquidtight flexible metal conduit is allowed only at locations called for in the Plans.

1. The use of aluminum conduit shall be restricted to above ground locations.
2. Aluminum conduit shall not be placed in concrete.

Metallic conduit shall be placed under existing pavement by approved directional boring, jacking or drilling methods, at locations approved by the Project Engineer. The pavement shall not be disturbed unless allowed in the Plans, or with the approval of the Project Engineer in the event that obstructions or impenetrable soils are encountered.

When approved by the Project Engineer, small test holes may be cut in the pavement to locate obstructions. When the Contractor encounters obstructions or is unable to install conduit because of soil conditions, as determined by the Project Engineer, additional work to place the conduit will be paid in accordance with Section 1-04.4.

When open trenching is allowed, trench construction shall conform to the following:

1. The pavement shall be sawcut a minimum of 3 inches deep. The cuts shall be parallel to each other and extend 2 feet beyond the edge of the trench.
2. Pavement shall be removed in an approved manner.
3. Trench depth shall provide 2 feet minimum cover over conduits.
4. Trench width shall be 4 inches or the conduit diameter plus 2 inches, whichever is larger.
5. Trenches located within paved roadway areas shall be backfilled with controlled density fill (CDF) meeting the requirements of Section 2-09.3(1)E. The controlled density fill shall be placed level to, and at the bottom of the existing

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1 pavement. The pavement shall be replaced with paving material that matches the
2 existing pavement.

3 On new construction, conduit shall be placed prior to placement of base course pavement.

4 Conduit terminating in foundations shall extend a maximum of 2 inches above the foundation
5 vertically including grounded end bushing or end bell.

6 Conduit entering through the bottom of a junction box shall be located near the end walls to
7 leave the major portion of the box clear. At all outlets, conduit shall enter from the direction of
8 the run, terminating 6 to 8 inches below the junction box lid and within 3 inches of the box wall
9 nearest its entry location.

10 Galvanized rigid steel conduit entering cable vaults shall extend 2 inches for the installation of
11 grounded end bushing and bonding. PVC conduit entering cable vaults and pull boxes shall
12 terminate flush with the inside walls of the structure. All conduit ends shall be terminated with
13 termination kits.

14 *When conduit is to be placed under pavement it shall be placed prior to the placement of a*
15 *subbase, base, surfacing, and pavement.*

16 Conduit entering through the bottom of a junction box shall be located near the end walls to
17 leave the major portion of the box clear. At all outlets, conduit shall enter from the direction of
18 the run, terminating 6 to 8 inches below the junction box lid and within 3 inches of the box wall
19 nearest its entry location.

20 Suitable marker stakes shall be set at the ends of conduits, which are buried so that they can be
21 easily located.

22 Fittings shall be installed at locations as designated by the Project Engineer so as to provide a
23 conduit channel that will permit freedom for installing the electrical control wires. When conduit
24 fittings are called for in the Plans, or where their installation is required by the Project Engineer,
25 the Contractor shall also furnish all necessary covers and gaskets.

26 All covered underground conduit shall be cleaned with an approved sized mandrel and blown out
27 with compressed air prior to pulling wire.

28 Conduits installed for future use shall be prepared as follows: After final assembly in place, the
29 conduit shall be blown clean with compressed air. Then, in the presence of the Project Engineer,
30 a cleaning mandrel correctly sized for each size of conduit shall be pulled through to ensure that
31 the conduit has not been deformed. As soon as the mandrel has been pulled through, a pull tape
32 shall be installed and both ends of the conduit shall be sealed with conduit caps. All conduits
33 scheduled for future use shall originate in a foundation or junction box as detailed in the Plans
34 and terminate in a junction box. All equipment grounding conductors, and the bonding
35 conductor for metallic conduits shall be bonded in all junction boxes in accordance with Section
36 8-20.3(9).

Where surface mounting of conduit is required, supports shall consist of "unistrut" type or equal mounting complete with clamps sized for the conduit. Support spacing shall comply with the Code or shall be as noted in the Contract. Approved expansion fittings shall be installed at all expansion joints. Approved deflection fittings shall be installed at the joint between the bridge end and the retaining wall end and the transition point from the bridge attachment to the underground section. In addition to the expansion fittings installed at all expansion joints, when PVC conduit is installed, an additional expansion fitting shall be installed for each 100 feet of conduit. Fasteners shall be as approved by the Project Engineer.

Existing conduit in place scheduled to receive new conductors shall have any existing conductors removed and a cleaning mandrel sized for the conduit shall be pulled through.

Conduit runs shown in the Plans are for bidding purposes only and may be changed, with approval of the Project Engineer, to avoid underground obstructions.

A maximum of 1000 feet of continuous open trench will be allowed, unless otherwise approved by the Project Engineer. All conduit exposed above grade level, or on any elevated structures, or as noted in the Plans shall be galvanized rigid steel innerduct conduit.

~~8-203(6)~~ JUNCTION BOXES, CABLE VAULTS, AND PULL BOXES

This section is deleted in its entirety and replaced with the following:

Standard junction boxes, pull boxes and cable vaults shall be installed at the locations shown in the Plans. The Contractor may install, at no expense to the Contracting Agency, such additional boxes as may be desired to facilitate the Work. Junction box installation shall conform to details in the WSDOT Standard Plans.

All junction box lids and frames shall be grounded by means of a minimum No. 8 AWG braided tinned copper bonding jumper bolted to the lid with countersunk stainless steel bolts that will allow the removal of the junction box lid without breaking the ground.

Cable vaults and pull boxes shall be installed in accordance with the following:

1. Excavation shall be performed in accordance with Section 2-09.
2. Cable vaults and pull boxes shall be installed on 6 inches of crushed surfacing top course, per section 9-03.9(3), placed on a compacted or undisturbed level foundation. If a cable vault or pull box is installed outside a paved area, an asphalt pad shall be constructed surrounding the junction box.
3. All openings around conduits shall be sealed and filled with grout to prevent water and debris from entering the vaults or pull boxes. The grout shall meet the specifications of the cable vault and pull box manufacturers.
4. Backfilling around the Work shall not be allowed until the concrete or mortar has set.
5. Pull boxes shall be installed in accordance with Plans and details.

- 1 6. Pull boxes shall be configured such that the tensile and bending limitations of the
2 cable are not compromised. Pull boxes shall be configured to mechanically
3 protect the cable against installation force as well as inert forces after cable
4 pulling operations.
- 5 7. Upon acceptance of work, cable vaults, and pull boxes shall be free of debris and
6 ready for cable installation. All grounding requirements shall be met prior to
7 cable installation.
- 8 8. Where installed near steel casings, the pull boxes and cable vaults shall be offset 3
9 feet, minimum from the centerline of the casing. Factory bends shall be used to
10 route the conduits to the cable vault or pull box.

11 Adjustments involving raising or lowering the junction boxes shall require conduit modification
12 if the resultant clearance between the top of the conduit and the junction box lid becomes less
13 than 6 inches or more than 8 inches in accordance with WSDOT Standard Plan J-11a.

14 Cable vaults and pull boxes shall be adjusted to final grade using risers or rings manufactured by
15 the cable vault and pull box manufacturer. Cable vaults and pull boxes with traffic bearing lids
16 shall be raised to final grade using ring risers to raise the cover only.

17 All voids resulting from the adjustment shall be backfilled with materials matching adjacent
18 surfacing material and compacted in accordance with Section 2-09.3(1)E.

19 Damage to the junction boxes, pull boxes, cable vaults and the associated conduit system, or
20 wiring resulting from the Contractor's operations, shall be repaired to the Project Engineer's
21 satisfaction at no additional cost to the Contracting Agency.

22 Both existing and new junction boxes, pull boxes, and cable vaults shall be adjusted to be flush
23 with the finished grade as well as with the grade during the various construction stages proposed
24 in the Contract.

25 Where conduit and junction boxes are placed in barrier, the Contractor shall coordinate the work
26 of the sub contractor constructing the barrier and the electrical sub contractor so that each
27 junction box placed in the barrier is placed in correct alignment with respect to the barrier, with
28 the face of the box flush or uniformly chamfered within ½ inch of the barrier surface. If any
29 point on the surface of the junction box placed in barrier is recessed more than 1/2 inch from the
30 surface of the barrier, the Contractor shall install a box extension meeting the Project Engineer's
31 approval and grout around the extension or remove and replace the entire section of barrier.

32 ~~8-20.3(8)~~ **WRING**

33 The third paragraph of this section is deleted and replaced with the following

34 All splices in underground illumination circuits, induction loop circuits, and magnetometer
35 circuits shall be installed in junction boxes. The only splice allowed in induction loop circuits
36 and magnetometer circuits shall be the splice connecting the induction loop lead-in conductors or
37 magnetometer lead-in conductors to the existing shielded home run cable. Loop wires shall be

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spliced to lead-in cable at the loop junction box with an approved mastic tape, 3-M 06147 or equal. The mastic pad shall be a minimum of 5 inches long. The mastic splice shall be centered on the wire at the splice point, folded up around the sides, and jointed at the top. The mastic pad ends shall be visible and fully sealed to the conductor insulation. The ends of the lead-in cable shall have the sheathing removed 8 inches and shall be dressed external to the splice. All connections with #10 and smaller wire shall use copper crimped connectors installed with a positive action (ratchet) tool. The non-insulated die shall be an indent type and insulated die shall be of a smooth shape capable of crimping pre-insulated terminals and connectors. The tool shall be compound lever type with a ratchet mechanism to ensure positive closure for full crimping cycle. The tool shall be field adjustable to proper calibration with common tools and materials. All connectors shall be wrapped with two layers of electrical tape. All epoxy splice kits shall be physically separated from other splices and wiring within the junction box to avoid damage from heat during the casting process.

~~8-203(8)~~B SIGNAL SPLICES
(NEW SECTION)

Signal cable shall be spliced only in poles, pedestal bases, or overhead within 2 feet of the poles. Aerial splices shall be covered by reverse wrapping of the first layer with electrician insulating tape, then a built-up rounded end of electrical tape, then a minimum of 2 layers forward with electrician tape. At locations where existing signal cables are being utilized, the traffic signal cables shall be spliced in pole or pedestal bases and each individual conductor shall be insulated and the entire splice shall be waterproofed. Each individual splice or termination of extra leads shall be insulated, taped and made waterproof. Service cable or master cable shall not be spliced except as indicated on the Plans.

~~8-203(9)~~ BONDING, GROUNDING

The first paragraph of this section is deleted and replaced with the following:

All metallic appurtenances containing electrical conductors (luminaires, light standards, cabinets, metallic conduit, non-metallic conduit, etc.) shall be made mechanically and electrically secure to form a continuous systems that shall be effectively grounded. Where metallic conduit systems are employed, the conduit system constitutes the equipment grounding conductor. Where non-metallic conduit is installed, the installation shall include an equipment ground conductor, in addition to the conductors noted in the Contract. Bonding jumpers and equipment grounding conductors shall be installed in accordance with Section 9-29.3. and sized per NEC 250-122. Where parallel circuits are enclosed in a common conduit, the equipment grounding conductor shall be sized by the largest overcurrent device serving any circuit contained within the conduit.

The following is added at the end of this section:

Where conductors are adjusted in size to compensate for voltage drop, equipment grounding conductors shall be adjusted proportionately according to circular mil area in compliance with NEC 250-122(b).

The grounding electrode system shall consist of a ground ring and shall be 25 ohms or less impedance. The ground ring shall be placed in contact with the earth at a depth of 2.5 feet or

more and consist of bare copper conductor not smaller than No. 2. The grounding electrode system shall be tested with a ground rod tester in the presence of the Electrical Inspector prior to activating the service.

~~8-203(10)~~ SERVICES TRANSFORMER, INTELLIGENT TRANSPORTATION SYSTEM CABINET

The following is added at the end of this section:

The Contractor shall request the State Department of Labor and Industries (L&I) to perform required inspections for service approval. The request by the Contractor to L&I shall be sent by certified mail with a copy forwarded to the County. The Contractor shall notify the Project Engineer when the service is approved by L&I and ready for connection.

~~8-203(11)~~ TESTING

The fourth paragraph of this section is deleted and replaced with the following:

The Contractor shall conduct functional tests to demonstrate that each part of the illumination system or other electrical system functions as specified. These demonstrations shall be conducted in the presence of aN Electrical Technician or Supervisor, and the Electrical Inspector.

~~8-203(13A)~~ LIGHT STANDARDS

The following is added at the end of this section:

Light standards shall meet the minimum requirements listed below and be approved by the Project Engineer. Shop drawings and calculations shall be prepared by (or under the direction of) a Professional Engineer, licensed under Title 18 RCW, State of Washington., and shall carry the Professional Engineer's signature and seal.

Light standards shall be handled when loading, unloading, and erecting in such a manner that they will not be damaged. Any parts that are damaged due to the Contractor's operations shall be repaired or replaced at the Contractor's expense.

Light standards shall not be erected on concrete foundations until foundations have set at least 72-hours or attained a compressive strength of 2,400-PSI, and shall be raked sufficiently to be plumb after all load has been placed.

"Pole In Ground" installations shall conform to COSP number 536a using Seattle City Light (SCL) Stock Pole #573986, Mast Arm #570527 and Foundation #568028. For pole base and bracket arm installation the Contractor shall conform to COSP number 572.

"Sidewalk Luminaire Pole" as shown on plan sheet IL10 detail 5, shall conform to the following minimum requirements:

- 1. Pole top tenon which is compatible with selected post top luminaire.*
- 2. 10' pole height.*
- 3. Round aluminum tapered formed shaft, with extruded base, and cast transition pieces.*

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4. *All hardware shall be corrosion resistant stainless steel.*
5. *Anchor bolts shall be ¾" x 27", 55000 PSI minimum yield strength, galvanized to ASTM A-153, with a threaded end, 2 oversized washers, and 2 hex nuts for double nutting.*
6. *Two piece decorative base cover which extends approximately 45" up the pole from the pole base.*
7. *Pole finish shall be "Silverbrite" with "flat" finish. Provide two coat powder or liquid, plus primer and top coat.*

All other installations: "Pole on SE Wall Moment Slab," "Pole on Bridge Deck" and "Pole on Bascule Pier" shall conform to the requirements as specified in the Plans, manufacturer specifications, and these Special Provisions. The Contractor shall procure the following:

1. *The bracket arm flange plate shall conform to COSP number 572. The base plate shall conform to the Plans and these Special Provisions.*
2. *Pole base shall use four 1" diameter bolts on 11 ½" diameter bolt circle per Seattle City Light standards.*
3. *Pole shaft shall be round tapered fluted steel, with "16-flat" pattern (16 ridges along the circumference, and rounded peaks).*
4. *Pole shaft shall conform to ASTM A595 Grade A.*
5. *The pole height, when combined with the mast arm, shall provide a 37' mounting height from the roadway to the bottom of the light fixture.*
6. *Finish shall be galvanized + finish paint.*
7. *1'-0" pole top tenon (in some locations).*

Where the pole top tenon is required by the Plans, the Contractor shall provide a design to properly connect the pole extension, required for the lightning protection air terminal, to the pole top tenon. The Contractor design shall be submitted to the Project Engineer for approval.

Fixed pole base installation, for all installations other than "Pole In Ground" installations, shall conform to the following:

1. *At all "Pole on SE Wall Moment Slab" installations the Contractor shall construct a concrete moment slab as detailed in the Plans. At all "Pole on Bridge Deck" and "Pole on Bascule Pier" installations the Contractor shall include the additional reinforcing steel in the base structure as detailed in the Plans.*
2. *For each light standard, the Contractor shall install one (1) modified 10" dia. Bridge elbow with four (4) 1" dia. All Thread Rod (ATR) tapped into the top flange as detailed in the Plans, one (1) bottom flange conforming to sheet 3 of 4 of WSDOT*

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Pre-approved Plan #DB00653, four (4) high strength full thread anchor bolts and one (1) anchor plate conforming to WSDOT Bridge Standard Drawing 10.2-A7-2. The Contractor shall install all heavy-hex nuts, lock washers, plate washers, standard washers, machine screws and decorative cover plates as required by the Plans.

3. ATR tapped into the top flange of bridge elbow shall be peened in prior to welding the top flange to the elbow and extend through the top heavy-hex nut a minimum of 2 full threads. ATR shall be tightened in accordance with Section 6-03.3(33) and 8-20.3(4). The ATR shall be tightened to the specified torque, plus or minus 2-percent, in 2 stages using an accurately calibrated torque wrench upon erection of the light standard. Except as otherwise specified, the Contractor shall tighten the ATR to a torque of 95-foot-pounds.
4. Anchor bolts shall extend through the top heavy-hex nut a minimum of 2 full threads. Anchor bolts shall be tightened by the Turn-Of-Nut Tightening Method in accordance with Sections 6-03.3(33) and 8-20.3(4).
5. The galvanized surfaces of all plates shall be smooth, without irregularities, to reduce friction and to prevent slackening of bolt tension due to flattening of the irregularities.
6. Anchor bolts damaged after the foundation concrete is placed shall not be repaired by bending or welding. The Contractor's repair procedure is to be submitted to the Project Engineer for approval prior to making any repairs. The procedure is to include removing the damaged portion of the anchor bolts, cutting threads on the undamaged portion to remain, the installation of an approved threaded sleeve nut and stud, and repairing the foundation with epoxy concrete. Epoxy concrete shall meet the requirements of Section 9-26.3(1)B.
7. Grout pads where applicable shall not extend above the elevation of the bottom of the anchor plate.

All new light standards shall have an approved metal tag riveted to the pole above the handhole. The information provided on the tag and the location of the tag shall be as noted on the pre-approved drawings.

For "Pole In Ground" installations handholes shall be located and installed as per Page 1 of 4 of WSDOT Standard Drawing #DB00653. For all other installations handholes shall be located as per Page 3 of 4 and installed as per Page 1 of 4 of WSDOT Pre-approved Plan #DB00653.

All new and relocated metal light standards shall be numbered for identification using painted series C numbers installed 3-feet above the base facing the Traveled Way. Paint shall be black enamel alkyd gloss conforming to Federal Specification TT-E489. The following information shall be provided.

1. Luminaire Number
2. Luminaire Wattage

3. Luminaire Voltage

4. Service Number

~~8-20.3(14)C~~ INDUCTION LOOP VEHICLE DETECTORS

The second sentence of item 2 in this section is deleted.

The following is added at the end of item 4:

Disconnect existing loops from loop lead in cables at the splice point. Replace loops in the roadway and splice to the existing lead in cables. All loops shall be tested in accordance with Section 8-20.3(14)D and approved by the Project Engineer prior to placement of the final lift of asphalt. Vehicle loop detectors indicated on the Plans are located schematically and actual loop detector locations will be verified by the Project Engineer prior to sawcut or installation. The Contractor shall mark out proposed detector loops on the roadway at least 5 calendar days before any sawcut or installation occurs. The location of stop bar pavement marking shall be obtained by the Contractor prior to sawcut or loop detector installation. In general, loop locations shall be located behind existing or proposed stop bar pavement marking, and shall not be located where pavement dowel or tie bars or metal supports within the pavement are located. Loops located within or beyond the stop bar pavement marking will not be allowed. The Contractor shall not begin sawcutting pavement until loop locations have been approved by the Project Engineer. When parallel to a pavement joint or edge, the sawcut shall be at least 1 foot away from the edge or joint. All saw cuts shall be cleaned of all debris.

The Contractor shall sawcut pavement to a depth that provides a minimum 1 inch cover between the top of loop wire and pavement surface.

One single continuous length of loop wire shall be used to form a loop with four turns in the loop saw cut. The wire shall be placed by tamping it into the saw cut with a blunt wooden stick, taking care not to damage the insulation. To reduce abrasion of the insulation, the Contractor shall sawcut all corners at least once to reduce the corner angle. This corner angle shall then be filed or smoothed acceptably free of sharp edges.

The sawcut in concrete shall be filled with a quick-drying high strength highway concrete patching material. The Contractor shall submit to the Project Engineer at least 5 calendar days in advance of starting work, a catalog cut describing the patch material properties including strength and time to develop strength characteristics.

In asphalt installations, the loop wire shall be sealed with an asphaltic sealant approved by the Project Engineer. Sealing shall not be performed when the pavement is damp.

When placing loops across joints or cracks in pavement, the portion of wires across the joint or crack shall be protected by placing it in tubing as indicated on COSP. The tubing shall be sliced open to insert the wire in the tubing and then placed across the joint or crack extending a minimum six inches each side of the joint or crack.

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1 Loop wire, from the loop to the lead-in splice, shall be twisted a minimum of 3 turns per foot.
2 Care shall be taken so that the twists are uniform.

3 A minimum of 60 inches of loop wire shall be brought into the handhole and spliced to the lead-
4 in cable with a crimped soldered, waterproof splice.

5 ~~8-203(14D)~~ **TEST FOR INDUCTION LOOPS AND LEAD-IN CABLE**

6 This section is deleted in its entirety and replaced with the following:

7 All tests shall be performed by the Contractor in the presence of the Electrical Inspector or
8 Traffic Signal Technician for each loop or the tests will be conducted by County personnel at the
9 request of the Contractor. The tests shall be performed at the amplifier location after complete
10 installation of the loop. All costs associated with testing shall be included in the unit Contract
11 prices of the respective bid items.

12 Test A — The DC resistance between the two lead-in cable wires will be measured by a volt ohm
13 meter. The resistance shall not exceed 5 ohms measured at the loop ends in the junction box.

14 Test B — A megohm meter test at 500 volts DC shall be made between the lead-in cable shield
15 and grounding, prior to connection to grounding. The resistance shall equal or exceed 200
16 megohms.

17 Test C — A megger test shall be made between the loop circuit and grounding. The resistance
18 shall equal or exceed 200 megohms.

19 Test D — An inductance test to determine the inductance level of each inductance loop. The
20 Contractor shall record the inductance level of each inductance loop installed on the project and
21 shall furnish the findings to the Project Engineer. An inductance level 90 micro-henries.

22 If any of the installations fails to pass all tests, the loop installation or lead-in cable shall be
23 repaired and replaced and then retested.

24 ~~8-203(16)~~ **REINSTALLING SALVAGED MATERIAL**

25 The last paragraph in this section is deleted and replaced with the following:

26 Metal poles relocated to new permanent locations shall be inspected by the Contractor in the
27 presence of the Electrical Inspector for structural integrity prior to reinstalling. The Contractor
28 shall arrange for a magnetic particle test, at the Contractor's expense, on all metal poles to be
29 relocated

30 ~~8-203(18)~~ **3-CONDUIT DUCT BANK AND 6-CONDUIT DUCT BANK**
31 **(NEWSECTION)**

32 This Work shall include the installation of 3-Conduit Duct Bank and 6-Conduit Duct Bank as
33 shown in the Plans. This Work consists of excavation, foundation preparation, bedding, 3-
34 conduit and 6-conduit duct banks, backfilling, compaction and restoration pavement.

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1 Examine site and identify existing and proposed utilities and structures and proposed earthquake
2 drains system in the area prior to performing any excavation. The location of the duct banks and
3 utility vaults shall be verified in the field prior to construction and shall not conflict with
4 earthquake drains system. Notify the Project Engineer of any discrepancies not shown in the
5 Plans. Construction activities shall avoid impeding traffic and access to abutting properties.
6 Adequate traffic control shall be provided when needed.

7 Prior to purchase of utility vaults and other components of 6-conduit duct bank the Contractor
8 shall submit Request for Approval of Material (RAM) for approval. Utility vault shown adjacent
9 to Seattle City Light power pole at approximate SPB Sta. 40+00, right shall be precast vault with
10 outside dimension of 13'-1" by 8'-0", and in addition shall have top including two risers, one
11 cover slab with SCL non-skid lid, one cover slab and one round vented cover. Utility vault
12 shown at approximate SPB Sta. 38+50, right shall be precast vault with outside dimension of 7'-
13 0" by 4'-8" with cover. Both vault lids shall have "SCL ELECT" designation and all frame and
14 covers shall be H-20 rate.

15 Precast vaults for electrical transformer and for electrical feed shall be installed according to
16 Seattle City Light (SCL) construction guidelines. Electrical feed conduits of the 6-conduit duct
17 bank shall run from 10-feet above ground on SCL utility pole to utility vaults to disconnect
18 switch on abutment wall. Electrical feed conduits shall be installed according to SCL
19 construction guidelines. The 6-conduit duct bank is subject to inspection and approval of SCL
20 inspector.

21 After excavation, vaults for electrical feed shall be placed on 6-inches compacted gravel backfill
22 of foundation class A.

23 Ten (10) days prior to installation the Contractor shall **submit** utility vault drawings for 6-
24 conduit duct bank showing specific knockout locations for the electric feed.

25 Pull boxes shown shall be WSDOT Standard Detail J-90.10.00. Pull boxes located in paved
26 areas shall Heavy Duty Pull Box and those located in unpaved areas shall have Standard Duty
27 Pull Box. Pull box lids shall have "COMM" system identification and King County symbol. The
28 Utility vaults and pull boxes shall be installed per Section 8-20.3(6).

29 Where shown, 3-Conduit Duct Bank and 6-Conduit Duct Bank shall be installed below grade
30 using the appropriate trench detail. Slope trenches a minimum of 4% so that conduit and ducts
31 drain towards vaults. Make joints in ducts and fittings watertight according to manufacturer's
32 instructions and accordance with the current electrical codes. Stagger couplings so those of
33 adjacent ducts do not lie in the same plane. Conduit ends shall be terminated with termination
34 kits. Conduits on the bridge structure shall be installed using utility hangers as detailed in Plans
35 and Section 6-01.10(A).

36 Duct banks shall be formed, full length to the line and grade required. Conduits shall meet the
37 requirements in accordance with Section 8-20.3(5). Rigid conduit spacers shall be installed at 5
38 feet minimum spacing in all duct banks to separate conduit and maintain separation from
39 reinforcing. Do not pour concrete until conduit installation has been inspected and approved.

Remove all debris, rocks, broken concrete, and formwork before backfilling trenches. Duct banks shall be reinforced and backfilled with orange tinted CDF as detailed in the Plans. Spade concrete carefully during pours to prevent voids under and between conduits and at the exterior surface of the envelope. Do not use power-driven agitating equipment unless specifically designed for duct bank application. Pour each duct bank between structures in one continuous operation. When more than one pour is necessary, terminate each pour in a vertical plane. Conduit end bell fittings shall be provided for each conduit to be terminated at vaults. Warning tape and orange #14 THWN or XHHW location wire shall be provided as detailed in the Plans and Section 8-20.3(5). Warning tape and wire shall extend the full length of the duct bank. Final pavement or pavement restoration shall be completed.

After final assembly in place, each duct bank shall be tested and cleaned. Then, in the presence of the Project Engineer, pull brush through full length of ducts using round bristle with a diameter ½" greater than internal diameter of duct. A cleaning mandrel, correctly sized for each conduit, shall be pulled through to ensure the conduit has not been deformed. Install 200-pound minimum tensile strength pull string in each conduit duct, including spares. Clean internal surfaces of vaults.

8-20.4 MEASUREMENT

The first paragraph in this section is deleted and replaced with the following:

When shown as lump sum in the Plans or in the proposal as illumination or temporary signal revision, no specific unit of measurement will apply, but measurement will be for the sum total of all items for a complete system to be furnished and installed.

The following is added at the end of this section:

When shown as lump sum in the Plans or in the proposal as 3-Conduit Duct Bank and 6-Conduit Duct Bank no specific unit of measurement will apply, but measurement will be for the sum total of all items for a complete system to be furnished and installed.

The lump sum Contract price for "Illumination System" contains the following approximate quantities of materials and completed Work:

Seattle City Light Stock Pole #573986	3	Each
Seattle City Light Stock Mast Arm #570527	3	Each
Seattle City Light Stock Foundation #568028 (complete)	3	Each
400W HPS Roadway Luminaire	18	Each
Round Tapered Fluted Steel Pole	18	Each
1'-0" Pole Top Tenon (See Sheet BE22)	2	Each
Underpass Light	1	Each
Elbow w/ Modified Top Flange & WSDOT Bot. Flange	18	Each

SPECIAL PROVISIONS
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1	All Thread Rod (ATR)	72	Each
2	High Strength Full Thread Anchor Bolt	72	Each
3	Anchor Plate	863	LB.
4	Heavy Hex Nuts	288	Each
5	Plate Washer	144	Each
6	Standard Round Washer	72	Each
7	Hardened Lock Washer	144	Each
8	Stainless Steel Machine Screw	144	Each
9	Screw Lock Washer	144	Each
10	Decorative Cover Plate	18	Each
11	Concrete Class 4000P	18	C.Y.
12	Epoxy Coated Stl. Reinf. Bar	5000	LB.
13	The lump sum Contract price for "3-Conduit Duct Bank" contains the following approximate		
14	quantities of materials and completed Work:		
15	Conduit Pipe 2 In. Diam., Sch 40	70	L.F.
16	Conduit Pipe 4 In. Diam., Sch 40	140	L.F.
17	Controlled Density Fill	72	CF
18	Backfill	10	C.Y.
19	Pipe Bedding Material	2	CF
20	Structure Excavation Cl. B	12	C.Y.
21	Warning Tape	70	L.F.
22	Utility Pull Box	2	Each
23	Conduit Riser	3	Each
24	Pull String	210	L.F.
25	Location Wire	70	L.F.
26	Abutment Riser and Fasteners	3	Each
27	The lump sum Contract price for "6-Conduit Duct Bank" contains the following approximate		
28	quantities of materials and completed Work:		

SPECIAL PROVISIONS
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1	Conduit Pipe 2 In. Diam., Sch 40	200 L.F.
2	Conduit Pipe 3 In. Diam., Sch 40	200 L.F.
3	Conduit Pipe 4 In. Diam., Sch 40	400 L.F.
4	Conduit Pipe 4 In. Diam., Sch 40 (Electrical Feed)	430 L.F.
5	Controlled Density Fill	560 CF
6	Fluidized Thermal Backfill (FTB)	580 CF
7	Backfill	105 C.Y.
8	Pipe Bedding Material	25 CF
9	HMA	15 C.Y.
10	Structure Excavation Cl. B	200 C.Y.
11	Warning Tape	200 L.F.
12	Detectable Marking Tape	215 L.F.
13	Precast Vault for Electrical Transformers	1 Each
14	Precast Vault for Electrical Feed	1 Each
15	Utility Pull Box	1 Each
16	Conduit Riser	4 Each
17	Pull String	1400 L.F.
18	Location Wire	440 L.F.
19	Abutment Riser and Fasteners	5 Each
20	Gravel Backfill for Foundation Class A	4 C.Y.
21	Rigid Steel Conduit Riser	40 L.F.

22 The quantities listed for items included "3-Conduit Duct Bank" and "6-Conduit Duct Bank" are
23 only for the convenience of the Contractor in determining the volume of work involved and are
24 not guaranteed to be accurate. The prospective bidders shall verify these quantities before
25 submitting a bid. No adjustments other than for approved changes will be made in the lump sum
26 Contract prices for 3-Conduit Duct Bank and 6-Conduit Duct Bank even though the actual
27 quantities required may deviate from those listed

28 ~~8-205~~ **PAYMENT**

29 This section is deleted in its entirety and replaced with the following:

SPECIAL PROVISIONS
SOUTH PARK BRIDGE NO. 3179
(14th/16th Avenue South over Duwamish Waterway)

1 Payment will be made in accordance with Section 1-04.1, for each of the following bid items that
2 are included in the proposal:

3 “Illumination System”, lump sum.

4 The lump sum Contract price for “Illumination System” shall be full pay for the construction of
5 the complete electrical system, modifying existing systems, or both, as shown in the Plans and
6 herein specified including excavation, backfilling, concrete foundations, conduit, wiring,
7 restoring facilities destroyed or damaged during construction, salvaging existing materials, and
8 for making all required tests. All additional materials and labor, not shown in the Plans or called
9 for herein and which are required to complete the electrical system, shall be included in the lump
10 sum Contract price.

11 “Temporary Signal Revision”, lump sum.

12 The lump sum Contract price for “Temporary Signal Revision” shall be full pay for modifying
13 existing systems for all stages of construction, as shown in the Plans and herein specified
14 including excavation, backfilling, concrete foundations, conduit, wiring, restoring facilities
15 destroyed or damaged during construction, salvaging existing materials, and for making all
16 required tests. All additional materials and labor, not shown in the Plans or called for herein and
17 which are required to complete the electrical system, shall be included in the lump sum Contract
18 price.

19 “Conduit Pipe ____ In. Diam.”, per linear foot.

20 The unit Contract price per linear foot for “Conduit ____ In. Diam.” shall be full pay for
21 furnishing all pipe, pipe connections, elbows, bends, caps, reducers, conduits, access fittings, and
22 unions; for placing the pipe in accordance with the above provisions, including hanging from
23 approach span pipe hangers, all excavation, directional boring, jacking or drilling required,
24 backfilling of any voids around casing, conduits, pits or the trenches, restoration of native
25 vegetation disturbed by the operation, chipping of pavement, and bedding of the pipe; and all
26 other work necessary for the construction of the conduit, except that when conduit is included on
27 any project as an integral part of an illumination system or the conduit duct bank is not shown as
28 a pay item, it shall be included in the lump sum price for the system shown.

29 All costs for installing conduit containing illumination wiring shall be included in the Contract
30 prices for the illumination system.

31 All costs for installing junction boxes containing illumination wiring shall be included in the
32 Contract prices for the illumination system.

33 “3-Conduit Duct Bank”, lump sum.

34 The lump sum Contract price for “3-Conduit Duct Bank” shall be full pay to provide a complete
35 3-conduit duct bank system, including, but not limited to furnishing and installing the conduit,
36 joints and fittings, spacers, hangers, straps, warning tape, wire, pull string, pullbox, utility vaults,

including all excavation, dewatering and groundwater control, bedding, backfilling, final pavement and testing and cleaning of the conduits.

“6-Conduit Duct Bank”, lump sum.

The lump sum Contract price for “6-Conduit Duct Bank” shall be full pay to provide a complete 6-conduit duct bank system, including, but not limited to furnishing and installing the conduit, joints and fittings, spacers, hangers, straps, warning tape, wire, pull String, pullbox, utility vaults, including all excavation, dewatering and groundwater control, bedding, backfilling, final pavement and testing and cleaning of the conduits.

8-21 PERMANENT SIGNING

Section 8-21.1 is deleted in its entirety and replaced with the following:

King County shall furnish and erect new signs within the limits of the Work. The Contractor shall coordinate with King County on installations, site access and schedule. The Contractor shall notify King County a minimum of two weeks in advance of opening new bridge for installation of required signage necessary of opening bridge to public.

The Contractor shall notify Richard Garcia (206-684-2732), King County Metro Construction Coordinator, for coordinating relocations of bus stop signs and other Metro items during construction.

The Contractor shall notify Drew Robinson (206-684-2105) of King County Metro for coordinating removals and relocations of bus shelters during construction.

8-22 PAVEMENT MARKING

8-221 DESCRIPTION

The following is added at the end of this section:

The Plastic Stop Bar, Plastic Bicycle Lane Symbol and Plastic Traffic Letter shall be installed in accordance with Figure 4-003 in the King County 2007 Design and Construction Standards Manual. The Lane Extension Line shall be installed in accordance with Figure 4-004 in the King County 2007 Design and Construction Standards Manual.

8-223(6) REMOVAL OF PAVEMENT MARKINGS

The following is added at the end of this section:

Removal of Raised Pavement Markers

No portion of the raised pavement markers is to remain. The Contractor shall remove raised pavement markers including epoxy or other adhesive in a manner that will not damage the underlying pavement. Any damage to the underlying pavement caused by the Contractor’s operations shall be repaired to the satisfaction of the Project Engineer at no additional cost to the Contracting Agency.